GenCore version 5.1.6
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OM protein - protein search, using sw model

Run on: February 14, 2005, 14:48:56 ; Search time 172 Seconds
(without alignments)
1466.092 Million cell updates/sec

Title: US-10-614-076-98
Perfect score: 3406
Sequence: 1 MNPNNRSEHDTIKVTPNSEL.....SFVSNEKIYIDKIEFIPVQL 652

Scoring table: BLOSUM62
Gapop 10.0 , Gapext 0.5

Searched: 2105692 seqs, 386760381 residues

Total number of hits satisfying chosen parameters: 2105692

Minimum DB seq length: 0
Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 150 summaries

Database : A_Geneseq_16Dec04:*
1: geneseqp1980s:*
2: geneseqp1990s:*
3: geneseqp2000s:*
4: geneseqp2001s:*
5: geneseqp2002s:*
6: geneseqp2003as:*
7: geneseqp2003bs:*
8: geneseqp2004s:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	% Query Match	Length	DB	ID	Description
1	3406	100.0	652	2	AAR14047	Aar14047 B.thuring
2	3406	100.0	652	2	AAY23207	Aay23207 Amino aci
3	3406	100.0	652	2	AAY23212	Aay23212 Amino aci
4	3406	100.0	652	3	AAY70441	Aay70441 Bacillus
5	3406	100.0	652	6	ABU09192	Abu09192 Bacillus
6	3406	100.0	652	7	ABW01050	Abw01050 Bacillus
7	3406	100.0	652	8	ADR89425	Adr89425 cry3Bb. 1
8	3402	99.9	652	2	AAY23205	Aay23205 Amino aci
9	3401	99.9	652	2	AAY23178	Aay23178 Amino aci
10	3401	99.9	652	3	AAY70443	Aay70443 Synthetic
11	3401	99.9	652	6	ABU09194	Abu09194 Bacillus
12	3401	99.9	652	7	ABW01052	Abw01052 Bacillus
13	3400	99.8	652	2	AAY23195	Aay23195 Amino aci
14	3400	99.8	652	2	AAY23187	Aay23187 Amino aci
15	3399	99.8	652	2	AAY23193	Aay23193 Amino aci
16	3399	99.8	652	2	AAY23198	Aay23198 Amino aci
17	3398	99.8	652	2	AAY23175	Aay23175 Amino aci
18	3398	99.8	652	2	AAY23184	Aay23184 Amino aci
19	3398	99.8	652	2	AAY23192	Aay23192 Amino aci
20	3396	99.7	652	2	AAY23203	Aay23203 Amino aci
21	3396	99.7	652	2	AAY23177	Aay23177 Amino aci
22	3395	99.7	652	2	AAY23176	Aay23176 Amino aci
23	3395	99.7	652	2	AAY23188	Aay23188 Amino aci
24	3393	99.6	652	2	AAY23181	Aay23181 Amino aci
25	3393	99.6	652	2	AAY23204	Aay23204 Amino aci
26	3392	99.6	652	2	AAY23201	Aay23201 Amino aci
27	3392	99.6	652	2	AAY23186	Aay23186 Amino aci
28	3390	99.5	652	2	AAY23179	Aay23179 Amino aci
29	3390	99.5	652	2	AAY23191	Aay23191 Amino aci
30	3390	99.5	652	2	AAY23180	Aay23180 Amino aci
31	3389	99.5	652	2	AAY23173	Aay23173 Amino aci
32	3387.5	99.5	651	2	AAY23197	Aay23197 Amino aci
33	3387	99.4	652	2	AAY23183	Aay23183 Amino aci
34	3386	99.4	652	2	AAY23174	Aay23174 Amino aci
35	3386	99.4	652	2	AAY23185	Aay23185 Amino aci
36	3385	99.4	652	2	AAY23194	Aay23194 Amino aci
37	3382	99.3	652	2	AAY23182	Aay23182 Amino aci
38	3380	99.2	652	2	AAY23190	Aay23190 Amino aci
39	3380	99.2	652	2	AAY23189	Aay23189 Amino aci
40	3379	99.2	652	2	AAY23196	Aay23196 Amino aci
41	3377	99.1	652	2	AAY23172	Aay23172 Amino aci
42	3377	99.1	653	2	AAY23208	Aay23208 Amino aci
43	3377	99.1	653	3	AAY70444	Aay70444 Bacillus
44	3377	99.1	653	6	ABU09195	Abu09195 Bacillus
45	3377	99.1	653	6	ABU09198	Abu09198 Bacillus
46	3377	99.1	653	7	ABW01053	Abw01053 Bacillus
47	3375	99.1	652	2	AAY23209	Aay23209 Amino aci
48	3373	99.0	653	3	AAY70446	Aay70446 Bacillus
49	3373	99.0	653	6	ABU09197	Abu09197 Bacillus
50	3373	99.0	653	6	ABU09202	Abu09202 Bacillus
51	3373	99.0	653	7	ABW01055	Abw01055 Bacillus
52	3366.5	98.8	651	2	AAY23199	Aay23199 Amino aci
53	3366	98.8	653	3	AAY70445	Aay70445 Bacillus
54	3366	98.8	653	6	ABU09200	Abu09200 Bacillus
55	3366	98.8	653	6	ABU09196	Abu09196 Bacillus
56	3366	98.8	653	7	ABW01054	Abw01054 Bacillus
57	3364	98.8	652	2	AAY23202	Aay23202 Amino aci
58	3361	98.7	652	2	AAY23211	Aay23211 Amino aci
59	3361	98.7	652	3	AAY70442	Aay70442 Bacillus
60	3361	98.7	652	6	ABU09193	Abu09193 Bacillus
61	3361	98.7	652	7	ABW01051	Abw01051 Bacillus
62	3358.5	98.6	651	2	AAY23200	Aay23200 Amino aci
63	3212	94.3	651	2	AAR06460	Aar06460 BtPGS1208
64	3212	94.3	651	2	AAW06419	Aaw06419 Antiscara
65	3212	94.3	659	2	AAY23213	Aay23213 Amino aci
66	3212	94.3	659	8	ADR89424	Adr89424 cry3Ba. 1
67	3196	93.8	651	2	AAR33769	Aar33769 Bt isolat
68	3082	90.5	659	1	AAP92106	Aap92106 Bacillus
69	2867	84.2	572	2	AAR26574	Aar26574 Sequence
70	2582	75.8	493	2	AAY23206	Aay23206 Amino aci
71	2344.5	68.8	644	2	AAW34838	Aaw34838 Novel Cry
72	2342.5	68.8	644	2	AAW34830	Aaw34830 Novel Cry
73	2342.5	68.8	644	2	AAW34836	Aaw34836 Novel Cry
74	2341.5	68.7	644	1	AAP70085	Aap70085 Sequence
75	2341.5	68.7	644	1	AAP82487	Aap82487 Delta end
76	2341.5	68.7	644	1	AAP94679	Aap94679 Amino aci
77	2341.5	68.7	644	1	AAP95585	Aap95585 M-7 cryst
78	2341.5	68.7	644	2	AAR39751	Aar39751 Delta end
79	2341.5	68.7	644	2	AAR56697	Aar56697 CryIIIA i
80	2341.5	68.7	644	2	AAR56698	Aar56698 CryIIB in
81	2341.5	68.7	644	2	AAW34829	Aaw34829 Novel Cry
82	2341.5	68.7	644	2	AAW34831	Aaw34831 Novel Cry
83	2341.5	68.7	644	6	ABP72637	Abp72637 Bacillus
84	2341.5	68.7	652	2	AAY23214	Aay23214 Amino aci
85	2341.5	68.7	652	8	ADR89423	Adr89423 cry3Aa1.
86	2340.5	68.7	644	2	AAW34814	Aaw34814 Novel Cry
87	2340.5	68.7	644	2	AAW34839	Aaw34839 Novel Cry
88	2340.5	68.7	644	2	AAW34832	Aaw34832 Novel Cry
89	2339.5	68.7	644	2	AAW34822	Aaw34822 Novel Cry
90	2339.5	68.7	644	2	AAW34817	Aaw34817 Novel Cry
91	2338.5	68.7	644	2	AAR99960	Aar99960 B.t.t. co
92	2338.5	68.7	644	2	AAR99958	Aar99958 Bacillus
93	2338.5	68.7	644	2	AAW34827	Aaw34827 Novel Cry
94	2338.5	68.7	644	2	AAW34841	Aaw34841 Novel Cry
95	2337.5	68.6	644	2	AAW34828	Aaw34828 Novel Cry
96	2336.5	68.6	644	2	AAW34834	Aaw34834 Novel Cry
97	2336.5	68.6	644	2	AAW34835	Aaw34835 Novel Cry
98	2336.5	68.6	644	2	AAW34820	Aaw34820 Novel Cry

99	2336.5	68.6	644	2	AAW34812
100	2335.5	68.6	644	2	AAW34821
101	2335.5	68.6	644	2	AAW34825
102	2335.5	68.6	644	2	AAW34826
103	2335.5	68.6	644	2	AAW34840
104	2335.5	68.6	644	2	AAW34818
105	2335.5	68.6	644	2	AAW34813
106	2333.5	68.5	644	2	AAW34816
107	2333.5	68.5	644	2	AAW34815
108	2333.5	68.5	644	2	AAW34823
109	2333.5	68.5	644	2	AAW34833
110	2333.5	68.5	644	2	AAW34824
111	2332.5	68.5	644	2	AAW34837
112	2332.5	68.5	644	2	AAW34811
113	2331.5	68.5	644	1	AAP80467
114	2327.5	68.3	644	2	AAW34819
115	2312.5	67.9	644	6	AAO27315
116	2283.5	67.0	644	4	AAB84195
117	2269.5	66.6	645	2	AAW34784
118	2165	63.6	606	6	ABP72641
119	2152	63.2	649	2	AAR15630
120	2152	63.2	649	2	AAY23210
121	2138.5	62.8	597	2	AAW00334
122	2138.5	62.8	597	3	AAY69666
123	2138.5	62.8	597	6	ABP72638
124	2137.5	62.8	610	2	AAR05537
125	2137.5	62.8	610	2	AAW00333
126	2137.5	62.8	610	2	ADG25144
127	2137.5	62.8	610	3	AAY69667
128	2135.5	62.7	610	2	AAR85482
129	2133.5	62.6	597	6	ABP72642
130	2129.5	62.5	601	6	ABP72643
131	2125	62.4	598	6	ABP72640
132	2120	62.2	597	6	ABP72646
133	2116	62.1	602	6	ABP72645
134	2115	62.1	596	6	ABP72639
135	2108.5	61.9	956	2	AAR15784
136	2108.5	61.9	1100	2	AAR15783
137	2106	61.8	600	6	ABP72644
138	2078.5	61.0	914	2	AAR15785
139	1809	53.1	347	2	AAR15631
140	1272.5	37.4	1167	5	AAU80281
141	1233.5	36.2	300	2	AAR99959
142	1215	35.7	675	8	ADL15377
143	1214	35.6	675	8	ADL15345
144	1212.5	35.6	670	5	AAU99273
145	1211	35.6	673	5	AAU99265
146	1210.5	35.5	670	5	AAU99266
147	1210	35.5	673	5	AAU99271
148	1209.5	35.5	676	8	ADL15375
149	1208.5	35.5	674	8	ADL15385
150	1208.5	35.5	676	8	ADL15343

ALIGNMENTS

RESULT 1
AAR14047
ID AAR14047 standard; protein; 652 AA.
XX
AC AAR14047;
XX
DT 25-MAR-2003 (revised)
DT 07-JAN-1992 (first entry)
XX
DE B.thuringiensis CryIIIC insecticidal protein.
XX
KW insecticide; corn rootworm toxicity.
XX
OS Bacillus thuringiensis.
XX
PN WO9114778-A.

Aaw34812	Novel Cry
Aaw34821	Novel Cry
Aaw34825	Novel Cry
Aaw34826	Novel Cry
Aaw34840	Novel Cry
Aaw34818	Novel Cry
Aaw34813	Novel Cry
Aaw34816	Novel Cry
Aaw34815	Novel Cry
Aaw34823	Novel Cry
Aaw34833	Novel Cry
Aaw34824	Novel Cry
Aaw34837	Novel Cry
Aaw34811	Novel Cry
Aap80467	Bacillus
Aaw34819	Novel Cry
Aao27315	Bacillus
Aab84195	Amino aci
Aaw34784	An artifi
Abp72641	Modified
Aar15630	BtI109P i
Aay23210	Amino aci
Aaw00334	Bacillus
Aay69666	Wild-type
Abp72638	Cry3A tox
Aar05537	Synthetic
Aaw00333	Bacillus
Adg25144	Codon opt
Aay69667	Bacillus
Aar85482	Btt synth
Abp72642	Modified
Abp72643	Modified
Abp72640	Modified
Abp72646	Modified
Abp72645	Modified
Abp72639	Modified
Aar15784	B.thuring
Aar15783	B.thuring
Abp72644	Modified
Aar15785	B.thuring
Aar15631	BtI260 in
Aau80281	Bacillus
Aar99959	B.t.t. co
Adl15377	B thuring
Adl15345	B thuring
Aau99273	Bacillus
Aau99265	Bacillus
Aau99266	Bacillus
Aau99271	Bacillus
Adl15375	B thuring
Adl15385	B thuring
Adl15343	B thuring

XX
PD 03-OCT-1991.
XX
PF 20-MAR-1990; 90US-00496568.
XX
PR 20-MAR-1990; 90US-00496568.
XX
PA (ECOG-) ECOGEN INC.
XX
PI Donovan WP, Rupar MJ, Slaney AC, Hohnson TB;
XX
DR WPI; 1991-310578/42.
DR N-PSDB; AAQ14098.
XX
PT New bacillus thuringiensis cry111C gene - encoding protein with toxicity
PT to Coleoptera insects.
XX
PS Claim 4; Fig 1; 79pp; English.
XX
CC The cryIIIC gene was isolated from a B.thuringiensis strain EG4961
CC library in pUC18. Screening was by a cryIIIB gene probe. One positive
CC colony was subcloned and sequenced. It contained an 8.3kb fragment whose
CC ORF was deduced to encode a protein of mol. wt. 74393 Daltons. The
CC protein (designated CryIIIC) has enhanced corn rootworm toxicity compared
CC to known proteins CryIIIA and CryIIIB. The following amino acid residues
CC are thought to be significant for this toxicity: His9, His231, Gln339,
CC Phe352, Asn446, His449, Val450, Ser451, Lys600 and Lys624. The toxic
CC protein can be used in an insecticide composition. Insecticidal activity
CC can be enhanced by addition of CryI to the composition. (Updated on 25-
CC MAR-2003 to correct PI field.)
XX
SQ Sequence 652 AA;

Query Match 100.0%; Score 3406; DB 2; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Qy    1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy   61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db   61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy  121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db  121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy  181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db  181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy  241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db  241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy  301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db  301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy  361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db  361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy  421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db  421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy  481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db  481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
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Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 2
AAY23207
ID   AAY23207 standard; protein; 652 AA.
XX
AC   AAY23207;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of the wild type cry3Bb protein.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Disclosure; Page 480-482; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             100.0%;  Score 3406;  DB 2;  Length 652;
  Best Local Similarity   100.0%;  Pred. No. 7.4e-277;
  Matches  652;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 3
AAY23212
ID   AAY23212 standard; protein; 652 AA.
XX
AC   AAY23212;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3BB protein.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm; Cry3BB;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
```

PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Disclosure; Page 500-502; 512pp; English.
XX
CC The present sequence represents the Cry3BB protein. The specification
CC describes new Bacillus thuringiensis Cry3Bb mutant proteins, and provides
CC methods for producing them. The B. thuringiensis Cry3Bb polypeptide was
CC modified to have improved insecticidal activity or enhanced insecticidal
CC specificity against a target insect. The modification comprises at least
CC one amino acid substitution, addition, or deletion in the primary
CC sequence of the native or unmodified Cry3Bb polypeptide, wherein the
CC substitution or deletion occurs at a position corresponding to from about
CC amino acids 1-365 of the unmodified polypeptide sequence (AAY23207
CC represents the wild type Cry3Bb protein). The polypeptide can be used to
CC kill coleopteran pests, especially by application to the environment. It
CC is especially useful against southern corn rootworm and western corn root
CC worm, (Diabrotica undecimpunctata howardi Barber, and Diabrotica
CC virgifera vergifera LeConte respectively). The mutant cry3Bb
CC polynucleotides can also be used to produce transgenic plants with
CC increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 100.0%; Score 3406; DB 2; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

```
Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 4
AAY70441
ID AAY70441 standard; protein; 652 AA.
XX
AC AAY70441;
XX
DT 21-JUN-2000 (first entry)
XX
DE Bacillus thuringiensis delta-endotoxin, Cry3Bb1.
XX
KW delta-endotoxin; Cry3B; Cry3Bb1; Bt toxin; crystal protein; insect pest;
KW insecticide; Coleopteran; expression cassette; transgenic plant.
XX
OS Bacillus thuringiensis.
XX
PN WO200011185-A2.
XX
PD 02-MAR-2000.
XX
PF 19-AUG-1999; 99WO-US018883.
XX
PR 19-AUG-1998; 98US-0097150P.
XX
PA (MONS) MONSANTO CO.
XX
PI Romano CP;
XX
DR WPI; 2000-246568/21.
DR N-PSDB; AAZ51635.
XX
PT Novel expression cassettes which express Bacillus thuringiensis Cry3
PT delta-endotoxin portion which is toxic to coleopteran insect pests,
PT useful for producing transgenic plants with improved insecticidal
PT activity.
XX
PS Claim 5; Page 92-94; 171pp; English.
XX
CC The present sequence is a Bacillus thuringiensis delta-endotoxin, Cry3Bb1
CC which is toxic to Coleopteran insect pests. The coding sequence of this
CC protein is used in an expression cassette which provides improved
CC expression of Cry3B or Cry3B variant proteins in transgenic plants e.g.
CC maize. Transgenic plants expressing higher levels of Cry3B proteins
CC exhibit increased insecticidal activity against Coleopteran pests
XX
SQ Sequence 652 AA;

Query Match 100.0%; Score 3406; DB 3; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

```
Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
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                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
                |||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 5
ABU09192
ID ABU09192 standard; protein; 652 AA.
XX
AC ABU09192;
XX
DT 12-JUN-2003 (first entry)
XX
DE Bacillus thuringiensis delta endotoxin Cry3Bb1.
XX
KW Cry3Bb1; delta-endotoxin; plant; transgenic; insecticide; crystal 3;
KW Cry3; Coleopteran insect infestation; increased toxicity;
KW season long protection; beetle.
XX
OS Bacillus thuringiensis.
XX
PN US6501009-B1.
XX
PD 31-DEC-2002.
XX
PF 19-AUG-1999; 99US-00377466.
XX
PR 19-AUG-1999; 99US-00377466.
XX
PA (MONS) MONSANTO TECHNOLOGY LLC.
XX
PI Romano CP;
XX
DR WPI; 2003-352192/33.
DR N-PSDB; ABX95179.
XX
PT New modified polynucleotide useful for controlling Coleopteran insect
PT infestation in a field of crop plants encodes insecticidal crystal 3
PT Bacillus thuringiensis delta-endotoxin.
XX
PS Disclosure; Col 49-54; 107pp; English.
XX
CC The invention relates to a modified polynucleotide which encodes an
CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC as CryBb. The modified polynucleotide is useful for producing a
CC transformed cell, by introducing the modified polynucleotide into a cell
CC such as a plant cell (preferably a maize cell) or a microbial cell. The
CC modified polynucleotide is useful for producing a transformed maize plant
CC by introducing the modified polynucleotide into a maize plant cell,
CC selecting a transformed maize plant cell and regenerating a maize plant
CC from the transformed maize plant cell. A transgenic plant expressing the
CC modified polynucleotide is useful for controlling Coleopteran insect
CC infestation in a field of crop plants. The modified polynucleotide is
CC useful for producing transgenic plants expressing higher levels of the
CC insect controlling B. thuringiensis delta-endotoxin. The modified
CC polynucleotide provides up to 10 fold higher levels of insect controlling
CC delta-endotoxin relative to the highest levels obtained using prior
CC compositions. In particular, transgenic maize expressing higher levels of
CC the Cry3Bb protein designed to exhibit increased toxicity toward
CC Coleopteran pests deliver superior levels of insect protection and are
CC less likely to sponsor development of populations of target insects that
CC are resistant to the insecticidally active protein. Improved control of
CC susceptible target insect pests and season long protection from insect
CC pathogens is achieved using the modified polynucleotide. The modified
CC polynucleotide reduces the number of transgenic events that have to be
CC screened in order to identify one which contains beneficial levels of one
CC or more insect controlling compositions. The present sequence represents
CC the amino acid sequence of Bacillus thuringiensis delta endotoxin Cry3Bb1
XX
SQ Sequence 652 AA;

```
  Query Match             100.0%;  Score 3406;  DB 6;  Length 652;
  Best Local Similarity   100.0%;  Pred. No. 7.4e-277;
  Matches  652;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 6
ABW01050
ID ABW01050 standard; protein; 652 AA.

```
XX
AC   ABW01050;
XX
DT   15-JAN-2004  (first entry)
XX
DE   Bacillus thuringiensis Cry3Bb1-delta-endotoxin protein.
XX
KW   Transgenic plant; Cry3Bb1-delta-endotoxin; Coleopteran pest resistance;
KW   insecticide.
XX
OS   Bacillus thuringiensis.
XX
PN   US2003115630-A1.
XX
PD   19-JUN-2003.
XX
PF   29-AUG-2002; 2002US-00232665.
XX
PR   19-AUG-1999;   99US-00377466.
XX
PA   (ROMA/) ROMANO C P.
XX
PI   Romano CP;
XX
DR   WPI; 2003-810928/76.
DR   N-PSDB; AAD61783.
XX
PT   New transgenic plant resistant to Coleopteran pests, comprises Bacillus
PT   thuringiensis Cry3-delta-endotoxin gene.
XX
PS   Claim 5; Page 28-29; 0pp; English.
XX
CC   The invention relates to novel transgenic plants comprising Bacillus
CC   thuringiensis Cry3-delta-endotoxin gene or its variants having
CC   coleopteran inhibitory activity. The invention is useful for controlling
CC   Coleopteran insect infestation in a field of crop plants. The present
CC   sequence is B. thuringiensis Cry3Bb1-delta- endotoxin protein
XX
SQ   Sequence 652 AA;

  Query Match             100.0%;  Score 3406;  DB 7;  Length 652;
  Best Local Similarity   100.0%;  Pred. No. 7.4e-277;
  Matches  652;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 7
ADR89425
ID   ADR89425 standard; protein; 652 AA.
XX
AC   ADR89425;
XX
DT   18-NOV-2004  (first entry)
XX
DE   cry3Bb.
XX
KW   delta-endotoxin; delta-endotoxin associate polypeptide;
KW   expression cassette; transformation; transgenic; plant; bacteria;
KW   lepidoptera; coleoptera; pest; pesticide; resistance;
KW   pesticidal activity.
XX
OS   Bacillus thuringiensis.
XX
PN   WO2004074462-A2.
XX
PD   02-SEP-2004.
XX
PF   20-FEB-2004; 2004WO-US005829.
XX
PR   20-FEB-2003; 2003US-0448632P.
PR   20-FEB-2003; 2003US-0448633P.
PR   20-FEB-2003; 2003US-0448797P.
PR   20-FEB-2003; 2003US-0448806P.
PR   20-FEB-2003; 2003US-0448810P.
PR   20-FEB-2003; 2003US-0448812P.
PR   19-FEB-2004; 2004US-00781979.
PR   19-FEB-2004; 2004US-00782020.
PR   19-FEB-2004; 2004US-00782096.
PR   19-FEB-2004; 2004US-00782141.
PR   19-FEB-2004; 2004US-00782570.
PR   19-FEB-2004; 2004US-00783417.
XX
PA   (ATHE-) ATHENIX CORP.
XX
PI   Carozzi N,  Hargiss T,  Koziel MG,  Duck NB,  Carr B;
XX
DR   WPI; 2004-635574/61.
XX
PT   New isolated delta-endotoxin and delta-endotoxin-associated nucleic acids
PT   and polypeptides, useful for killing lepidopteran or coleopteran pests or
PT   for producing organisms with pesticide resistance.
XX
PS   Example 6; SEQ ID NO 37; 178pp; English.
XX
CC   This sequence represents a delta-endotoxin crystal protein. This protein
CC   was included in the scope of the invention as a comparison to the delta-
CC   endotoxins of the invention. Some of the delta-endotoxin coding sequences
CC   of the invention have alternative start codons, producing more than one
CC   protein from a single open reading frame. The nucleic acid sequences of
CC   the invention are useful in DNA constructs or expression cassettes for
CC   transformation and expression in plants and bacteria. The nucleic acids
CC   and corresponding polypeptides are useful for killing lepidopteran or
CC   coleopteran pests. Compositions containing the delta-endotoxins of the
```

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CC   invention, and methods for their production, are useful for the
CC   production of organisms with pesticide resistance, specifically bacteria
CC   and plants. These organisms are useful for generating altered or improved
CC   delta-endotoxin or delta-endotoxin-associated proteins that have
CC   pesticidal activity, or for detecting the presence of delta-endotoxin or
CC   delta-endotoxin-associated proteins or nucleic acids in products or
CC   organisms.
XX
SQ   Sequence 652 AA;

  Query Match             100.0%;  Score 3406;  DB 8;  Length 652;
  Best Local Similarity   100.0%;  Pred. No. 7.4e-277;
  Matches  652;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 8
AAY23205
ID   AAY23205 standard; protein; 652 AA.
XX
AC   AAY23205;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11095 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 457-460; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.9%;  Score 3402;  DB 2;  Length 652;
  Best Local Similarity   99.8%;  Pred. No. 1.6e-276;
  Matches  651;  Conservative    1;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||:||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLRPGYFGKDSFNYW 360
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Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 9
AAY23178
ID AAY23178 standard; protein; 652 AA.
XX
AC AAY23178;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11227 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 306-308; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.9%; Score 3401; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 1.9e-276;
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

```
Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDINLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 10
AAY70443
ID AAY70443 standard; protein; 652 AA.
XX
AC AAY70443;
XX
DT 21-JUN-2000 (first entry)
XX
DE Synthetic delta-endotoxin, Cry3Bb.
XX
KW delta-endotoxin; Cry3B; Cry3Bb; Bt toxin; crystal protein; insect pest;
KW insecticide; Coleopteran; expression cassette; transgenic plant.
XX
OS Synthetic.
OS Bacillus thuringiensis.

XX
PN WO200011185-A2.
XX
PD 02-MAR-2000.
XX
PF 19-AUG-1999; 99WO-US018883.
XX
PR 19-AUG-1998; 98US-0097150P.
XX
PA (MONS) MONSANTO CO.
XX
PI Romano CP;
XX
DR WPI; 2000-246568/21.
DR N-PSDB; AAZ51637.
XX
PT Novel expression cassettes which express Bacillus thuringiensis Cry3
PT delta-endotoxin portion which is toxic to coleopteran insect pests,
PT useful for producing transgenic plants with improved insecticidal
PT activity.
XX
PS Example 2; Page 101-103; 171pp; English.
XX
CC The present sequence is a synthetic delta-endotoxin, Cry3Bb which is
CC essentially homologous to the native protein from Bacillus thuringiensis.
CC The protein is toxic to Coleopteran insect pests. The corresponding gene
CC was used to create cry3Bb variant AAV11231 for use in an expression
CC cassette which provides improved expression of Cry3B or Cry3B variant
CC proteins in transgenic plants e.g. maize. Transgenic plants expressing
CC higher levels of Cry3B proteins exhibit increased insecticidal activity
CC against Coleopteran pests
XX
SQ Sequence 652 AA;

Query Match 99.9%; Score 3401; DB 3; Length 652;
Best Local Similarity 99.8%; Pred. No. 1.9e-276;
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

```
Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||| ||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYNTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 11
ABU09194
ID ABU09194 standard; protein; 652 AA.
XX
AC ABU09194;
XX
DT 12-JUN-2003 (first entry)
XX
DE Bacillus thuringiensis delta endotoxin Cry3Bb.
XX
KW Cry3Bb; delta-endotoxin; plant; transgenic; insecticide; crystal 3; Cry3;
KW Coleopteran insect infestation; increased toxicity;
KW season long protection; beetle.
XX
OS Bacillus thuringiensis.
OS Synthetic.
XX
PN US6501009-B1.
XX
PD 31-DEC-2002.
XX
PF 19-AUG-1999; 99US-00377466.
XX
PR 19-AUG-1999; 99US-00377466.
XX
PA (MONS) MONSANTO TECHNOLOGY LLC.
XX
PI Romano CP;
XX
DR WPI; 2003-352192/33.
DR N-PSDB; ABX95181.
XX
PT New modified polynucleotide useful for controlling Coleopteran insect
PT infestation in a field of crop plants encodes insecticidal crystal 3
PT Bacillus thuringiensis delta-endotoxin.
XX
PS Disclosure; Col 65-70; 107pp; English.
XX
CC The invention relates to a modified polynucleotide which encodes an
CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC as CryBb. The modified polynucleotide is useful for producing a
CC transformed cell, by introducing the modified polynucleotide into a cell
CC such as a plant cell (preferably a maize cell) or a microbial cell. The
CC modified polynucleotide is useful for producing a transformed maize plant
CC by introducing the modified polynucleotide into a maize plant cell,
CC selecting a transformed maize plant cell and regenerating a maize plant
CC from the transformed maize plant cell. A transgenic plant expressing the
CC modified polynucleotide is useful for controlling Coleopteran insect
CC infestation in a field of crop plants. The modified polynucleotide is
CC useful for producing transgenic plants expressing higher levels of the
CC insect controlling B. thuringiensis delta-endotoxin. The modified
CC polynucleotide provides up to 10 fold higher levels of insect controlling
CC delta-endotoxin relative to the highest levels obtained using prior
CC compositions. In particular, transgenic maize expressing higher levels of
CC the Cry3Bb protein designed to exhibit increased toxicity toward
CC Coleopteran pests deliver superior levels of insect protection and are
CC less likely to sponsor development of populations of target insects that
CC are resistant to the insecticidally active protein. Improved control of
CC susceptible target insect pests and season long protection from insect
CC pathogens is achieved using the modified polynucleotide. The modified
CC polynucleotide reduces the number of transgenic events that have to be
CC screened in order to identify one which contains beneficial levels of one
CC or more insect controlling compositions. The present sequence represents

```
CC   the amino acid sequence of Bacillus thuringiensis delta endotoxin Cry3Bb
XX
SQ   Sequence 652 AA;

  Query Match             99.9%;  Score 3401;  DB 6;  Length 652;
  Best Local Similarity   99.8%;  Pred. No. 1.9e-276;
  Matches  651;  Conservative    0;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||| ||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYNTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 12
ABW01052
ID   ABW01052 standard; protein; 652 AA.
XX
AC   ABW01052;
XX
DT   15-JAN-2004  (first entry)
XX
DE   Bacillus thuringiensis Cry3Bb-delta-endotoxin protein.
XX
KW   Transgenic plant; Cry3Bb-delta-endotoxin; Coleopteran pest resistance;
KW   insecticide.
XX
OS   Bacillus thuringiensis.
XX
PN   US2003115630-A1.
XX
PD   19-JUN-2003.
XX
PF   29-AUG-2002; 2002US-00232665.
XX
PR   19-AUG-1999;   99US-00377466.
XX
PA   (ROMA/) ROMANO C P.
XX
PI   Romano CP;
XX
DR   WPI; 2003-810928/76.
DR   N-PSDB; AAD61785.
XX
PT   New transgenic plant resistant to Coleopteran pests, comprises Bacillus
PT   thuringiensis Cry3-delta-endotoxin gene.
XX
PS   Disclosure; Page 36-38; 0pp; English.
XX
CC   The invention relates to novel transgenic plants comprising Bacillus
CC   thuringiensis Cry3-delta-endotoxin gene or its variants having
CC   coleopteran inhibitory activity. The invention is useful for controlling
CC   Coleopteran insect infestation in a field of crop plants. The present
CC   sequence is B. thuringiensis Cry3Bb-delta- endotoxin protein
XX
SQ   Sequence 652 AA;

  Query Match             99.9%;  Score 3401;  DB 7;  Length 652;
  Best Local Similarity   99.8%;  Pred. No. 1.9e-276;
  Matches  651;  Conservative    0;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||| ||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYNTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 13
```

```
AAY23195
ID   AAY23195 standard; protein; 652 AA.
XX
AC   AAY23195;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11036 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 401-403; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.8%;  Score 3400;  DB 2;  Length 652;
  Best Local Similarity   99.7%;  Pred. No. 2.4e-276;
  Matches  650;  Conservative    1;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||

Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||:||| |||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDVRLYPKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 14
AAY23187
ID   AAY23187 standard; protein; 652 AA.
XX
AC   AAY23187;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11236 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
```

```
XX
PS   Claim 39; Page 356-358; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.8%;  Score 3400;  DB 2;  Length 652;
  Best Local Similarity   99.8%;  Pred. No. 2.4e-276;
  Matches  651;  Conservative    0;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              |||||||||| ||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFILNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 15
AAY23193
ID   AAY23193 standard; protein; 652 AA.
XX
AC   AAY23193;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11032 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 390-392; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.8%;  Score 3399;  DB 2;  Length 652;
  Best Local Similarity   99.8%;  Pred. No. 2.9e-276;
  Matches  651;  Conservative    0;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              |||||||||||||||||||||||||||||||||||||||| ||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQGRIRELFSQAESHFRN 180
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Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 16
AAY23198
ID AAY23198 standard; protein; 652 AA.
XX
AC AAY23198;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11051 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 418-420; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.8%; Score 3399; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 2.9e-276;
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

```
Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              |||||||| ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSGFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 17
AAY23175
ID AAY23175 standard; protein; 652 AA.

```
XX
AC   AAY23175;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11224 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; western corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 289-291; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.8%;  Score 3398;  DB 2;  Length 652;
  Best Local Similarity   99.8%;  Pred. No. 3.5e-276;
  Matches  651;  Conservative    0;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 18
AAY23184
ID   AAY23184 standard; protein; 652 AA.
XX
AC   AAY23184;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11233 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 339-342; 512pp; English.
```

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XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.8%;  Score 3398;  DB 2;  Length 652;
  Best Local Similarity   99.7%;  Pred. No. 3.5e-276;
  Matches  650;  Conservative    1;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||:|||| ||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFALNTLDEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 19
AAY23192
ID   AAY23192 standard; protein; 652 AA.
XX
AC   AAY23192;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11242 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 384-387; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.8%;  Score 3398;  DB 2;  Length 652;
  Best Local Similarity   99.8%;  Pred. No. 3.5e-276;
  Matches  651;  Conservative    0;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
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                 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
                 ||||||||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIVLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
                 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
                 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
                 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
                 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
                 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
                 ||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 20
AAY23203
ID AAY23203 standard; protein; 652 AA.
XX
AC AAY23203;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11083 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 446-448; 512pp; English.
XX

CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

```
  Query Match             99.7%;  Score 3396;  DB 2;  Length 652;
  Best Local Similarity   99.5%;  Pred. No. 5.1e-276;
  Matches  649;  Conservative    2;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||:||| |||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDVRLYPKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||:|||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLRPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 21
AAY23177
ID AAY23177 standard; protein; 652 AA.
XX
AC AAY23177;

```
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11226 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 300-302; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.7%;  Score 3396;  DB 2;  Length 652;
  Best Local Similarity   99.8%;  Pred. No. 5.1e-276;
  Matches  651;  Conservative    0;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||| ||||||||| 

Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYTRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 22
AAY23176
ID   AAY23176 standard; protein; 652 AA.
XX
AC   AAY23176;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11225 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 294-297; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
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CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.7%;  Score 3395;  DB 2;  Length 652;
  Best Local Similarity   99.7%;  Pred. No. 6.2e-276;
  Matches  650;  Conservative    2;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||:|||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYNRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              :||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 SDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 23
AAY23188
ID   AAY23188 standard; protein; 652 AA.
XX
AC   AAY23188;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11237 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 362-364; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.7%;  Score 3395;  DB 2;  Length 652;
  Best Local Similarity   99.7%;  Pred. No. 6.2e-276;
  Matches  650;  Conservative    1;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
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Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              |||||||||| |:|||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFILHTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 24
AAY23181
ID AAY23181 standard; protein; 652 AA.
XX
AC AAY23181;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11230 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 322-325; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

```
  Query Match             99.6%;  Score 3393;  DB 2;  Length 652;
  Best Local Similarity   99.5%;  Pred. No. 9.1e-276;
  Matches  649;  Conservative    2;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||::||| ||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFAVNTLWEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 25
AAY23204
ID AAY23204 standard; protein; 652 AA.
XX
AC AAY23204;
XX
DT 24-AUG-1999 (first entry)

```
XX
DE   Amino acid sequence of Cry3Bb.11084 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 452-454; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.6%;  Score 3393;  DB 2;  Length 652;
  Best Local Similarity   99.7%;  Pred. No. 9.1e-276;
  Matches  650;  Conservative    0;  Mismatches    2;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              |||||||||||||||||||||||||||||||||||||| ||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQGRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              |||||||||| ||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFLLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 26
AAY23201
ID   AAY23201 standard; protein; 652 AA.
XX
AC   AAY23201;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11081 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 435-437; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
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```
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.6%;  Score 3392;  DB 2;  Length 652;
  Best Local Similarity   99.5%;  Pred. No. 1.1e-275;
  Matches  649;  Conservative    2;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              |||||||||||||||||||||||||||||||||||||||||| ||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQGRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||:|||||:|||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIPTLNTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 27
AAY23186
ID   AAY23186 standard; protein; 652 AA.
XX
AC   AAY23186;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11235 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 351-353; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.6%;  Score 3392;  DB 2;  Length 652;
  Best Local Similarity   99.7%;  Pred. No. 1.1e-275;
  Matches  650;  Conservative    0;  Mismatches    2;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||| |||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
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                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
                |||||||||| ||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFLLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
                |||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 28
AAY23179
ID   AAY23179 standard; protein; 652 AA.
XX
AC   AAY23179;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11228 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 311-313; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.5%;  Score 3390;  DB 2;  Length 652;
  Best Local Similarity   99.5%;  Pred. No. 1.6e-275;
  Matches  649;  Conservative    1;  Mismatches    2;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              |||||||||| | |||:||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 29
AAY23191
ID   AAY23191 standard; protein; 652 AA.
XX
AC   AAY23191;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11241 polypeptide.
```

```
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 379-381; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.5%;  Score 3390;  DB 2;  Length 652;
  Best Local Similarity   99.5%;  Pred. No. 1.6e-275;
  Matches  649;  Conservative    2;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||::| ||||||||||

Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFFNILLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 30
AAY23180
ID   AAY23180 standard; protein; 652 AA.
XX
AC   AAY23180;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11229 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 317-319; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
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CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.5%;  Score 3390;  DB 2;  Length 652;
  Best Local Similarity   99.5%;  Pred. No. 1.6e-275;
  Matches  649;  Conservative    2;  Mismatches    1;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||:|||||: ||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFTLNTLQKCGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 31
AAY23173
ID   AAY23173 standard; protein; 652 AA.
XX
AC   AAY23173;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11222 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 277-280; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.5%;  Score 3389;  DB 2;  Length 652;
  Best Local Similarity   99.7%;  Pred. No. 2e-275;
  Matches  650;  Conservative    0;  Mismatches    2;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||  |||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFLSRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
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Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
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RESULT 32
AAY23197
ID AAY23197 standard; protein; 651 AA.
XX
AC AAY23197;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11048 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 412-415; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 651 AA;

Query Match 99.5%; Score 3387.5; DB 2; Length 651;
Best Local Similarity 99.7%; Pred. No. 2.6e-275;
Matches 650; Conservative 1; Mismatches 0; Indels 1; Gaps 1;

```
Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              |||||||||||||||||||||||||||||||||||||||||||||: ||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSE-DPWKAFMAQVEVLIDK 119

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        120 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 179

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        180 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 239

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        240 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 299

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        300 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 359

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        360 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 419

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        420 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 479

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        480 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 539

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        540 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 599

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        600 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 651
```

RESULT 33
AAY23183
ID AAY23183 standard; protein; 652 AA.
XX
AC AAY23183;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11232 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;

```
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 334-336; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.4%;  Score 3387;  DB 2;  Length 652;
  Best Local Similarity   99.4%;  Pred. No. 2.9e-275;
  Matches  648;  Conservative    2;  Mismatches    2;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||:  |||:||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFTPTTLQDYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 34
AAY23174
ID   AAY23174 standard; protein; 652 AA.
XX
AC   AAY23174;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11223 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 283-285; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
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CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match            99.4%;  Score 3386;  DB 2;  Length 652;
  Best Local Similarity  99.5%;  Pred. No. 3.5e-275;
  Matches  649;  Conservative    0;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              |||||||||||||||||||||||||||||||||||||| |||||| ||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSPEDVAEFSHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||| |
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVXL 652


RESULT 35
AAY23185
ID   AAY23185 standard; protein; 652 AA.
XX
AC   AAY23185;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11234 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 345-347; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match            99.4%;  Score 3386;  DB 2;  Length 652;
  Best Local Similarity  99.4%;  Pred. No. 3.5e-275;
  Matches  648;  Conservative    1;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              |||||||||||||||||||||||||||||||||||||||||||| | : |||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDTRRFRKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
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                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
                ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
                ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 36
AAY23194
ID   AAY23194 standard; protein; 652 AA.
XX
AC   AAY23194;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11035 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 396-398; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.4%;  Score 3385;  DB 2;  Length 652;
  Best Local Similarity   99.4%;  Pred. No. 4.3e-275;
  Matches  648;  Conservative    1;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||:  || ||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRNPHSQGRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 37
AAY23182
ID   AAY23182 standard; protein; 652 AA.
XX
AC   AAY23182;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11231 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
```

KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 328-330; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.3%; Score 3382; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 7.7e-275;
Matches 648; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

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Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              |||||||||||||||||||||||||||||||||||||||||||||||||| |||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              |||||||||| | |||:||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 38
AAY23190
ID AAY23190 standard; protein; 652 AA.
XX
AC AAY23190;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11239 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 373-375; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified

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CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.2%;  Score 3380;  DB 2;  Length 652;
  Best Local Similarity   99.4%;  Pred. No. 1.1e-274;
  Matches  648;  Conservative    0;  Mismatches    4;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              |||||||||||| |   ||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLRTPLAYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 39
AAY23189
ID   AAY23189 standard; protein; 652 AA.
XX
AC   AAY23189;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11238 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 367-370; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.2%;  Score 3380;  DB 2;  Length 652;
  Best Local Similarity   99.4%;  Pred. No. 1.1e-274;
  Matches  648;  Conservative    0;  Mismatches    4;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              |||||||||||| |   ||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLVNLMVYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
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Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 40
AAY23196
ID AAY23196 standard; protein; 652 AA.
XX
AC AAY23196;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11046 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 407-409; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

```
  Query Match            99.2%;  Score 3379;  DB 2;  Length 652;
  Best Local Similarity  99.1%;  Pred. No. 1.4e-274;
  Matches  646;  Conservative    2;  Mismatches    4;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              ||||||||||||||||||||||||||||||||||||||||: || ||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRNPHSQGRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||:||| |||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDVRLYPKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 41
AAY23172
ID AAY23172 standard; protein; 652 AA.
XX
AC AAY23172;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11221 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX

OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 272-274; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.1%; Score 3377; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 2e-274;
Matches 648; Conservative 0; Mismatches 4; Indels 0; Gaps 0;

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Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
              |||||||||||||||||||||||||||||    | ||||||||||||||||||||||
Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKFHHSRRSKRSQDRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360
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Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
```

RESULT 42
AAY23208
ID AAY23208 standard; protein; 653 AA.
XX
AC AAY23208;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of plantized Cry3Bb.11231 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 484-486; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by

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CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 653 AA;

  Query Match             99.1%;  Score 3377;  DB 2;  Length 653;
  Best Local Similarity   99.4%;  Pred. No. 2e-274;
  Matches  647;  Conservative    1;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          2 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 61
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          3 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 62

Qy         62 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 121
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         63 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 122

Qy        122 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        123 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

Qy        182 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQYT 241
              |||||||||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
Db        183 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQYT 242

Qy        242 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 301
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        243 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 302

Qy        302 RDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 361
              ||||||||| | |||:||||||||||||||||||||||||||||||||||||||||||||
Db        303 RDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 362

Qy        362 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 421
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        363 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 422

Qy        422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 481
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 482

Qy        482 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 541
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        483 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 542

Qy        542 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        543 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

Qy        602 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||
Db        603 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 653


RESULT 43
AAY70444
ID   AAY70444 standard; protein; 653 AA.
XX
AC   AAY70444;
XX
DT   21-JUN-2000  (first entry)
XX
DE   Bacillus thuringiensis delta-endotoxin Cry3Bb variant v11231.
XX
KW   delta-endotoxin; Cry3B; Bt toxin; crystal protein; insect pest;
KW   insecticide; Coleopteran; expression cassette; transgenic plant;
KW   Cry3Bb variant v11231.
XX
OS   Bacillus thuringiensis.
OS   Synthetic.
XX
PN   WO200011185-A2.
XX
PD   02-MAR-2000.
XX
PF   19-AUG-1999;   99WO-US018883.
XX
PR   19-AUG-1998;   98US-0097150P.
XX
PA   (MONS ) MONSANTO CO.
XX
PI   Romano CP;
XX
DR   WPI; 2000-246568/21.
DR   N-PSDB; AAZ51638, AAZ51641, AAZ51642, AAZ51655, AAZ51656.
XX
PT   Novel expression cassettes which express Bacillus thuringiensis Cry3
PT   delta-endotoxin portion which is toxic to coleopteran insect pests,
PT   useful for producing transgenic plants with improved insecticidal
PT   activity.
XX
PS   Claim 6; Page 106-108; 171pp; English.
XX
CC   The present sequence is a Bacillus thuringiensis delta-endotoxin Cry3Bb
CC   variant AAV11231 which is toxic to Coleopteran insect pests. The coding
CC   sequence of this protein is used in an expression cassette that provides
CC   improved expression of Cry3B or Cry3B variant proteins in transgenic
CC   plants e.g. maize. Transgenic plants expressing higher levels of Cry3B
CC   proteins exhibit increased insecticidal activity against Coleopteran
CC   pests
XX
SQ   Sequence 653 AA;

  Query Match             99.1%;  Score 3377;  DB 3;  Length 653;
  Best Local Similarity   99.4%;  Pred. No. 2e-274;
  Matches  647;  Conservative    1;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          2 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 61
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          3 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 62

Qy         62 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 121
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         63 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 122

Qy        122 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        123 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

Qy        182 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQYT 241
              |||||||||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
Db        183 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQYT 242

Qy        242 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 301
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        243 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 302

Qy        302 RDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 361
              ||||||||| | |||:||||||||||||||||||||||||||||||||||||||||||||
Db        303 RDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 362

Qy        362 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 421
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        363 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 422

Qy        422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 481
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 482

Qy        482 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 541
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        483 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 542
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Qy        542 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        543 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

Qy        602 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||
Db        603 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 653


RESULT 44
ABU09195
ID   ABU09195 standard; protein; 653 AA.
XX
AC   ABU09195;
XX
DT   12-JUN-2003  (first entry)
XX
DE   Bacillus thuringiensis delta endotoxin Cry3Bbv11231.
XX
KW   Cry3Bbv11231; delta-endotoxin; plant; transgenic; insecticide; crystal 3;
KW   Cry3; Coleopteran insect infestation; increased toxicity;
KW   season long protection; beetle.
XX
OS   Bacillus thuringiensis.
OS   Synthetic.
XX
PN   US6501009-B1.
XX
PD   31-DEC-2002.
XX
PF   19-AUG-1999;   99US-00377466.
XX
PR   19-AUG-1999;   99US-00377466.
XX
PA   (MONS ) MONSANTO TECHNOLOGY LLC.
XX
PI   Romano CP;
XX
DR   WPI; 2003-352192/33.
DR   N-PSDB; ABX95182.
XX
PT   New modified polynucleotide useful for controlling Coleopteran insect
PT   infestation in a field of crop plants encodes insecticidal crystal 3
PT   Bacillus thuringiensis delta-endotoxin.
XX
PS   Example 2; Col 73-78; 107pp; English.
XX
CC   The invention relates to a modified polynucleotide which encodes an
CC   insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC   as CryBb. The modified polynucleotide is useful for producing a
CC   transformed cell, by introducing the modified polynucleotide into a cell
CC   such as a plant cell (preferably a maize cell) or a microbial cell. The
CC   modified polynucleotide is useful for producing a transformed maize plant
CC   by introducing the modified polynucleotide into a maize plant cell,
CC   selecting a transformed maize plant cell and regenerating a maize plant
CC   from the transformed maize plant cell. A transgenic plant expressing the
CC   modified polynucleotide is useful for controlling Coleopteran insect
CC   infestation in a field of crop plants. The modified polynucleotide is
CC   useful for producing transgenic plants expressing higher levels of the
CC   insect controlling B. thuringiensis delta-endotoxin. The modified
CC   polynucleotide provides up to 10 fold higher levels of insect controlling
CC   delta-endotoxin relative to the highest levels obtained using prior
CC   compositions. In particular, transgenic maize expressing higher levels of
CC   the Cry3Bb protein designed to exhibit increased toxicity toward
CC   Coleopteran pests deliver superior levels of insect protection and are
CC   less likely to sponsor development of populations of target insects that
CC   are resistant to the insecticidally active protein. Improved control of
CC   susceptible target insect pests and season long protection from insect
CC   pathogens is achieved using the modified polynucleotide. The modified
CC   polynucleotide reduces the number of transgenic events that have to be
CC   screened in order to identify one which contains beneficial levels of one
CC   or more insect controlling compositions. The present sequence represents
CC   the amino acid sequence of Bacillus thuringiensis delta endotoxin
CC   Cry3Bbv11231
XX
SQ   Sequence 653 AA;

  Query Match             99.1%;  Score 3377;  DB 6;  Length 653;
  Best Local Similarity   99.4%;  Pred. No. 2e-274;
  Matches  647;  Conservative    1;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          2 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 61
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          3 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 62

Qy         62 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 121
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         63 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 122

Qy        122 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        123 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

Qy        182 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQYT 241
              |||||||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
Db        183 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQYT 242

Qy        242 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 301
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        243 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 302

Qy        302 RDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 361
              ||||||||| | |||:|||||||||||||||||||||||||||||||||||||||||||||
Db        303 RDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 362

Qy        362 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 421
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        363 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 422

Qy        422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 481
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 482

Qy        482 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 541
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        483 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 542

Qy        542 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        543 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

Qy        602 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||
Db        603 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 653


RESULT 45
ABU09198
ID   ABU09198 standard; protein; 653 AA.
XX
AC   ABU09198;
XX
DT   12-JUN-2003  (first entry)
XX
DE   Bacillus thuringiensis delta endotoxin Cry3Bb1v11231.
XX
KW   Cry3Bb1v11231; delta-endotoxin; plant; transgenic; insecticide;
KW   crystal 3; Cry3; Coleopteran insect infestation; increased toxicity;
KW   season long protection; beetle.
XX
OS   Bacillus thuringiensis.
OS   Synthetic.
XX
PN   US6501009-B1.
XX
PD   31-DEC-2002.
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XX
PF   19-AUG-1999;   99US-00377466.
XX
PR   19-AUG-1999;   99US-00377466.
XX
PA   (MONS ) MONSANTO TECHNOLOGY LLC.
XX
PI   Romano CP;
XX
DR   WPI; 2003-352192/33.
DR   N-PSDB; ABX95185, ABX95186, ABX95199, ABX95200.
XX
PT   New modified polynucleotide useful for controlling Coleopteran insect
PT   infestation in a field of crop plants encodes insecticidal crystal 3
PT   Bacillus thuringiensis delta-endotoxin.
XX
PS   Disclosure; Col 101-104; 107pp; English.
XX
CC   The invention relates to a modified polynucleotide which encodes an
CC   insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC   as CryBb. The modified polynucleotide is useful for producing a
CC   transformed cell, by introducing the modified polynucleotide into a cell
CC   such as a plant cell (preferably a maize cell) or a microbial cell. The
CC   modified polynucleotide is useful for producing a transformed maize plant
CC   by introducing the modified polynucleotide into a maize plant cell,
CC   selecting a transformed maize plant cell and regenerating a maize plant
CC   from the transformed maize plant cell. A transgenic plant expressing the
CC   modified polynucleotide is useful for controlling Coleopteran insect
CC   infestation in a field of crop plants. The modified polynucleotide is
CC   useful for producing transgenic plants expressing higher levels of the
CC   insect controlling B. thuringiensis delta-endotoxin. The modified
CC   polynucleotide provides up to 10 fold higher levels of insect controlling
CC   delta-endotoxin relative to the highest levels obtained using prior
CC   compositions. In particular, transgenic maize expressing higher levels of
CC   the Cry3Bb protein designed to exhibit increased toxicity toward
CC   Coleopteran pests deliver superior levels of insect protection and are
CC   less likely to sponsor development of populations of target insects that
CC   are resistant to the insecticidally active protein. Improved control of
CC   susceptible target insect pests and season long protection from insect
CC   pathogens is achieved using the modified polynucleotide. The modified
CC   polynucleotide reduces the number of transgenic events that have to be
CC   screened in order to identify one which contains beneficial levels of one
CC   or more insect controlling compositions. The present sequence represents
CC   the amino acid sequence of Bacillus thuringiensis delta endotoxin
CC   Cry3Bb1v11231
XX
SQ   Sequence 653 AA;

  Query Match             99.1%;  Score 3377;  DB 6;  Length 653;
  Best Local Similarity   99.4%;  Pred. No. 2e-274;
  Matches  647;  Conservative    1;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          2 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 61
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          3 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 62

Qy         62 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 121
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         63 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 122

Qy        122 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        123 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

Qy        182 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQYT 241
              ||||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
Db        183 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQYT 242

Qy        242 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 301
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        243 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 302

Qy        302 RDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 361
              ||||||||| | |||:||||||||||||||||||||||||||||||||||||||||||||
Db        303 RDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 362

Qy        362 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 421
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        363 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 422

Qy        422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 481
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 482

Qy        482 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 541
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        483 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 542

Qy        542 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        543 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

Qy        602 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||
Db        603 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 653


RESULT 46
ABW01053
ID   ABW01053 standard; protein; 653 AA.
XX
AC   ABW01053;
XX
DT   15-JAN-2004  (first entry)
XX
DE   Bacillus thuringiensis Cry3Bb-delta-endotoxin variant v11231 protein.
XX
KW   Transgenic plant; Cry3Bb-delta-endotoxin; Coleopteran pest resistance;
KW   insecticide; variant.
XX
OS   Bacillus thuringiensis.
OS   Synthetic.
XX
PN   US2003115630-A1.
XX
PD   19-JUN-2003.
XX
PF   29-AUG-2002; 2002US-00232665.
XX
PR   19-AUG-1999;   99US-00377466.
XX
PA   (ROMA/) ROMANO C P.
XX
PI   Romano CP;
XX
DR   WPI; 2003-810928/76.
DR   N-PSDB; AAD61786, AAD61789, AAD61790, AAD61803, AAD61804.
XX
PT   New transgenic plant resistant to Coleopteran pests, comprises Bacillus
PT   thuringiensis Cry3-delta-endotoxin gene.
XX
PS   Claim 6; Page 40-42; 0pp; English.
XX
CC   The invention relates to novel transgenic plants comprising Bacillus
CC   thuringiensis Cry3-delta-endotoxin gene or its variants having
CC   coleopteran inhibitory activity. The invention is useful for controlling
CC   Coleopteran insect infestation in a field of crop plants. The present
CC   sequence is B. thuringiensis Cry3Bb-delta- endotoxin variant protein
XX
SQ   Sequence 653 AA;

  Query Match             99.1%;  Score 3377;  DB 7;  Length 653;
  Best Local Similarity   99.4%;  Pred. No. 2e-274;
  Matches  647;  Conservative    1;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          2 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 61
```

```
Db          3 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 62

Qy         62 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 121

Db         63 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 122

Qy        122 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181

Db        123 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

Qy        182 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQYT 241

Db        183 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQYT 242

Qy        242 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 301

Db        243 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 302

Qy        302 RDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 361

Db        303 RDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 362

Qy        362 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 421

Db        363 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 422

Qy        422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 481

Db        423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 482

Qy        482 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 541

Db        483 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 542

Qy        542 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601

Db        543 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

Qy        602 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652

Db        603 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 653


RESULT 47
AAY23209
ID   AAY23209 standard; protein; 652 AA.
XX
AC   AAY23209;
XX
DT   24-AUG-1999  (first entry)
XX
DE   Amino acid sequence of Cry3Bb.11098 polypeptide.
XX
KW   Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW   coleoptera; southern corn rootworm; western corn root worm;
KW   Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW   Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS   Synthetic.
OS   Bacillus thuringiensis.
XX
PN   WO9931248-A1.
XX
PD   24-JUN-1999.
XX
PF   17-DEC-1998;   98WO-US026852.
XX
PR   18-DEC-1997;   97US-00993170.
PR   18-DEC-1997;   97US-00993722.
PR   18-DEC-1997;   97US-00993775.
PR   18-DEC-1997;   97US-00996441.
XX
PA   (ECOG-) ECOGEN INC.
PA   (MONS ) MONSANTO CO.
XX
PI   English L,  Brussock SM,  Malvar TM,  Bryson JW,  Kulesza CA;
PI   Walters FS,  Slatin SL,  Von Tersch MA,  Romano C;
XX
DR   WPI; 1999-395184/33.
XX
PT   Insecticidal Bacillus thuringiensis proteins.
XX
PS   Claim 39; Page 492-494; 512pp; English.
XX
CC   AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC   Cry3Bb mutant proteins. The specification also describes methods of
CC   altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC   polypeptide was modified to have improved insecticidal activity or
CC   enhanced insecticidal specificity against a target insect. The
CC   modification comprises at least one amino acid substitution, addition, or
CC   deletion in the primary sequence of the native or unmodified Cry3Bb
CC   polypeptide, wherein the substitution or deletion occurs at a position
CC   corresponding to from about amino acids 1-365 of the unmodified
CC   polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC   The polypeptide can be used to kill coleopteran pests, especially by
CC   application to the environment. It is especially useful against southern
CC   corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC   howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC   The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC   plants with increased insecticide resistance
XX
SQ   Sequence 652 AA;

  Query Match             99.1%;  Score 3375;  DB 2;  Length 652;
  Best Local Similarity   99.2%;  Pred. No. 3e-274;
  Matches  647;  Conservative    1;  Mismatches    4;  Indels    0;  Gaps    0;

Qy          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Db          1 MNPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60

Qy         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Db         61 TVKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120

Qy        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180

Db        121 KIEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQGRIRELFSQAESHFRN 180

Qy        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQY 240

Db        181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQY 240

Qy        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Db        241 TDHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300

Qy        301 TRDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Db        301 TRDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYW 360

Qy        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Db        361 SGNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLG 420

Qy        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Db        421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAE 480

Qy        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Db        481 CFLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNL 540

Qy        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
```

```
Db        541 LFLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

Qy        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652


RESULT 48
AAY70446
ID   AAY70446 standard; protein; 653 AA.
XX
AC   AAY70446;
XX
DT   21-JUN-2000  (first entry)
XX
DE   Bacillus thuringiensis delta-endotoxin Cry3Bb variant 11231mv2.
XX
KW   delta-endotoxin; Cry3B; Bt toxin; crystal protein; insect pest;
KW   insecticide; Coleopteran; expression cassette; transgenic plant;
KW   Cry3Bb variant 11231mv2.
XX
OS   Bacillus thuringiensis.
OS   Synthetic.
XX
PN   WO200011185-A2.
XX
PD   02-MAR-2000.
XX
PF   19-AUG-1999;   99WO-US018883.
XX
PR   19-AUG-1998;   98US-0097150P.
XX
PA   (MONS ) MONSANTO CO.
XX
PI   Romano CP;
XX
DR   WPI; 2000-246568/21.
DR   N-PSDB; AAZ51640, AAZ51645, AAZ51646.
XX
PT   Novel expression cassettes which express Bacillus thuringiensis Cry3
PT   delta-endotoxin portion which is toxic to coleopteran insect pests,
PT   useful for producing transgenic plants with improved insecticidal
PT   activity.
XX
PS   Claim 6; Page 116-118; 171pp; English.
XX
CC   The present sequence is a Bacillus thuringiensis delta-endotoxin Cry3Bb
CC   variant 11231mv2 which is toxic to Coleopteran insect pests. The coding
CC   sequence of this protein is used in an expression cassette that provides
CC   improved expression of Cry3B or Cry3B variant proteins in transgenic
CC   plants e.g. maize. Transgenic plants expressing higher levels of Cry3B
CC   proteins exhibit increased insecticidal activity against Coleopteran
CC   pests
XX
SQ   Sequence 653 AA;

  Query Match             99.0%;  Score 3373;  DB 3;  Length 653;
  Best Local Similarity   99.2%;  Pred. No. 4.4e-274;
  Matches  646;  Conservative    2;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          2 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 61
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          3 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 62

Qy         62 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 121
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         63 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 122

Qy        122 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        123 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

Qy        182 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQYT 241
              ||||||||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
Db        183 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQYT 242

Qy        242 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 301
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        243 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 302

Qy        302 RDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 361
              ||||||||| | |||:||||||||||||||||||||||||||||:|||||||||||||||
Db        303 RDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLRPGYFGKDSFNYWS 362

Qy        362 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 421
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        363 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 422

Qy        422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 481
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 482

Qy        482 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 541
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        483 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 542

Qy        542 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        543 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

Qy        602 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        603 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 653


RESULT 49
ABU09197
ID   ABU09197 standard; protein; 653 AA.
XX
AC   ABU09197;
XX
DT   12-JUN-2003  (first entry)
XX
DE   Bacillus thuringiensis delta endotoxin Cry3Bb 11231mv2.
XX
KW   Cry3Bb 11231mv2; delta-endotoxin; plant; transgenic; insecticide;
KW   crystal 3; Cry3; Coleopteran insect infestation; increased toxicity;
KW   season long protection; beetle.
XX
OS   Bacillus thuringiensis.
OS   Synthetic.
XX
PN   US6501009-B1.
XX
PD   31-DEC-2002.
XX
PF   19-AUG-1999;   99US-00377466.
XX
PR   19-AUG-1999;   99US-00377466.
XX
PA   (MONS ) MONSANTO TECHNOLOGY LLC.
XX
PI   Romano CP;
XX
DR   WPI; 2003-352192/33.
DR   N-PSDB; ABX95184.
XX
PT   New modified polynucleotide useful for controlling Coleopteran insect
PT   infestation in a field of crop plants encodes insecticidal crystal 3
PT   Bacillus thuringiensis delta-endotoxin.
XX
PS   Disclosure; Fig 6; 107pp; English.
XX
CC   The invention relates to a modified polynucleotide which encodes an
CC   insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC   as CryBb. The modified polynucleotide is useful for producing a
```

CC transformed cell, by introducing the modified polynucleotide into a cell
CC such as a plant cell (preferably a maize cell) or a microbial cell. The
CC modified polynucleotide is useful for producing a transformed maize plant
CC by introducing the modified polynucleotide into a maize plant cell,
CC selecting a transformed maize plant cell and regenerating a maize plant
CC from the transformed maize plant cell. A transgenic plant expressing the
CC modified polynucleotide is useful for controlling Coleopteran insect
CC infestation in a field of crop plants. The modified polynucleotide is
CC useful for producing transgenic plants expressing higher levels of the
CC insect controlling B. thuringiensis delta-endotoxin. The modified
CC polynucleotide provides up to 10 fold higher levels of insect controlling
CC delta-endotoxin relative to the highest levels obtained using prior
CC compositions. In particular, transgenic maize expressing higher levels of
CC the Cry3Bb protein designed to exhibit increased toxicity toward
CC Coleopteran pests deliver superior levels of insect protection and are
CC less likely to sponsor development of populations of target insects that
CC are resistant to the insecticidally active protein. Improved control of
CC susceptible target insect pests and season long protection from insect
CC pathogens is achieved using the modified polynucleotide. The modified
CC polynucleotide reduces the number of transgenic events that have to be
CC screened in order to identify one which contains beneficial levels of one
CC or more insect controlling compositions. The present sequence represents
CC the amino acid sequence of Bacillus thuringiensis delta endotoxin Cry3Bb
CC 11231mv2
XX
SQ Sequence 653 AA;

Query Match 99.0%; Score 3373; DB 6; Length 653;
Best Local Similarity 99.2%; Pred. No. 4.4e-274;
Matches 646; Conservative 2; Mismatches 3; Indels 0; Gaps 0;

```
Qy          2 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 61
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          3 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 62

Qy         62 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 121
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         63 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 122

Qy        122 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        123 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

Qy        182 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQYT 241
              ||||||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
Db        183 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQYT 242

Qy        242 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 301
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        243 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 302

Qy        302 RDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 361
              ||||||||| | |||:||||||||||||||||||||||||||||||:||||||||||||||
Db        303 RDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLRPGYFGKDSFNYWS 362

Qy        362 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 421
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        363 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 422

Qy        422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 481
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 482

Qy        482 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 541
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        483 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 542

Qy        542 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        543 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

Qy        602 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||
```

Db 603 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 653

RESULT 50
ABU09202
ID ABU09202 standard; protein; 653 AA.
XX
AC ABU09202;
XX
DT 12-JUN-2003 (first entry)
XX
DE Bacillus thuringiensis delta endotoxin Cry3Bb1 11231mv2.
XX
KW Cry3Bb1 11231mv2; delta-endotoxin; plant; transgenic; insecticide;
KW crystal 3; Cry3; Coleopteran insect infestation; increased toxicity;
KW season long protection; beetle.
XX
OS Bacillus thuringiensis.
OS Synthetic.
XX
PN US6501009-B1.
XX
PD 31-DEC-2002.
XX
PF 19-AUG-1999; 99US-00377466.
XX
PR 19-AUG-1999; 99US-00377466.
XX
PA (MONS) MONSANTO TECHNOLOGY LLC.
XX
PI Romano CP;
XX
DR WPI; 2003-352192/33.
DR N-PSDB; ABX95189, ABX95190.
XX
PT New modified polynucleotide useful for controlling Coleopteran insect
PT infestation in a field of crop plants encodes insecticidal crystal 3
PT Bacillus thuringiensis delta-endotoxin.
XX
PS Disclosure; Col 139-142; 107pp; English.
XX
CC The invention relates to a modified polynucleotide which encodes an
CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC as CryBb. The modified polynucleotide is useful for producing a
CC transformed cell, by introducing the modified polynucleotide into a cell
CC such as a plant cell (preferably a maize cell) or a microbial cell. The
CC modified polynucleotide is useful for producing a transformed maize plant
CC by introducing the modified polynucleotide into a maize plant cell,
CC selecting a transformed maize plant cell and regenerating a maize plant
CC from the transformed maize plant cell. A transgenic plant expressing the
CC modified polynucleotide is useful for controlling Coleopteran insect
CC infestation in a field of crop plants. The modified polynucleotide is
CC useful for producing transgenic plants expressing higher levels of the
CC insect controlling B. thuringiensis delta-endotoxin. The modified
CC polynucleotide provides up to 10 fold higher levels of insect controlling
CC delta-endotoxin relative to the highest levels obtained using prior
CC compositions. In particular, transgenic maize expressing higher levels of
CC the Cry3Bb protein designed to exhibit increased toxicity toward
CC Coleopteran pests deliver superior levels of insect protection and are
CC less likely to sponsor development of populations of target insects that
CC are resistant to the insecticidally active protein. Improved control of
CC susceptible target insect pests and season long protection from insect
CC pathogens is achieved using the modified polynucleotide. The modified
CC polynucleotide reduces the number of transgenic events that have to be
CC screened in order to identify one which contains beneficial levels of one
CC or more insect controlling compositions. The present sequence represents
CC the amino acid sequence of Bacillus thuringiensis delta endotoxin Cry3Bb1
CC 11231mv2
XX
SQ Sequence 653 AA;

Query Match 99.0%; Score 3373; DB 6; Length 653;
Best Local Similarity 99.2%; Pred. No. 4.4e-274;

```
  Matches  646;  Conservative    2;  Mismatches    3;  Indels    0;  Gaps    0;

Qy          2 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 61
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          3 NPNNRSEHDTIKVTPNSELQTNHNQYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNST 62

Qy         62 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 121
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         63 VKDAVGTGISVVGQILGVVGVPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 122

Qy        122 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        123 IEEYAKSKALAELQGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

Qy        182 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYHRQLKLTQQYT 241
              |||||||||||||||||||||||||||||||||||||||||||||| ||||||||||
Db        183 MPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSEDVAEFYRRQLKLTQQYT 242

Qy        242 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 301
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        243 DHCVNWYNVGLNGLRGSTYDAWVKFNRFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 302

Qy        302 RDIFTDPIFSLNTLQEYGPTFLSIENSIRKPHLFDYLQGIEFHTRLQPGYFGKDSFNYWS 361
              ||||||||| | |||:||||||||||||||||||||||||||:|||||||||||||
Db        303 RDIFTDPIFLLTTLQKYGPTFLSIENSIRKPHLFDYLQGIEFHTRLRPGYFGKDSFNYWS 362

Qy        362 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 421
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        363 GNYVETRPSIGSSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAWPNGKVYLGV 422

Qy        422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 481
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDEPLEKAYSHQLNYAEC 482

Qy        482 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 541
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        483 FLMQDRRGTIPFFTWTHRSVDFFNTIDAEKITQLPVVKAYALSSGASIIEGPGFTGGNLL 542

Qy        542 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        543 FLKESSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

Qy        602 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
              |||||||||||||||||||||||||||||||||||||||||||||||||||
Db        603 DDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 653


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Job time : 181 secs
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